RocketRAID 432x
SAS/SATAII Host Adapter
User's Guide

HighPoint

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HighPoint Technologies, Inc.

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HighPoint Technologies, Inc.

HighPoint Technologies, long recognized as a leader in mass storage technologies specializes in the design and manufacturer of HBA (Host Bus Adapters) and HighPoint RAID IP (Intellectual Property). HighPoint provides a broad range of scalable hardware HBA's that meet the storage requirements from Enterprise to SMB (Small Medium Sized Business) to PC enthusiast.

The HighPoint RAID IP includes **TerabyteArchitecture**™ for (Performance, Protection and Prevention).

TerabyteStream™ - leverages the built-in Intel Xscale XOR Engine to deliver unprecedented RAID 5 and 6 performances.

TerabyteGuard™ - prevents data lose and increases data reliability with advanced hard drive inspection features utilizing bad sector repair and remapping.

TerabyteSaver™ - optimizes data protection with a battery backup and with write journaling thus preventing data loss.

Congratulations

You have purchased one of the highest performing and SAS/SATA hardware RAID controllers available. The RocketRAID 4300 series offers the performance and data protection features for homogeneous storage environments. The RocketRAID 4300 series meets the bandwidth requirements for high performance applications like video capture and editing, CAD/CAM and digital graphics.

Remember to visit the HighPoint websites at http://www.highpoint-tech.com and http://www.hptmac.com. There you can find information on all of HighPoint's products with FAQ's, online manuals, BIOS and driver updates.

1 - Specifications and Features

Host Adapter Architecture

- TerabyteStream™ for Blazing Performance
- TerabyteSaver™ and TerabyteGuard™ for Data Protection and Reliability
- Intel IOP 81348 (1.2GHz)
- PCI -Express x8 (compatible with x16 slot)
- 256 MB(RocketRAID 4320) / 512MB(RocketRAID 4322) of DDR II memory with ECC protection
- RocketRAID 432x directly support up to 8 SAS/SATAII drives , and up to 128 SAS devices via SAS expanders
- Multi adapter support up to 4 adapters
- Intel RAID 6 (P+Q) for large capacity RAID arrays
- NVRAM for write journaling
- Battery Backup Unit (BBU) Optional
- RoHS compliant

Advanced RAID Features

- Supports RAID 0,1,3,5,6,10,50 and JBOD
- Multiple RAID array support
- Multiple logical drive support
- BIOS booting support
- BIOS PnP and BBS (BIOS boot specification)support
- Write through and write back cache
- Online Array roaming
- Online capacity expansion (OCE) and Online RAID level migration (ORLM)
- Quick and Background initialization for instant RAID configuration
- Automatic RAID rebuild
- 64bit LBA support greater than 2TB per volume
- S.M.A.R.T monitoring hard drive status for reliability
- Staggered Drive Spinup
- (MAID) spin down drives in array when idle
- ATA pass-through mode support
- Firmware update while running the Operating System

Array Monitors, Alerts and Indicators

- SMTP for email notification
- Hardware Monitor function
- Alarm / Buzzer alerts for drive failure
- SAF-TE (I2C) and SGPIO enclosure management
- SNMP for remote management
- Ethernet port for (OBM) Out of Band Management
- NTP (Network Time Protocol)
- Intelli-VRM. (Intelligent Virtual RAID Management)
- SHI – Storage Health Inspector (S.M.A.R.T. and disk maintenance)

HighPoint RAID Management (HRM)

- Hot key (ctrl-h) boot-up RAID manager via BIOS
- Web browser-base RAID management software
- Command Line Interface (CLI)
- API library for customizing AP

Operating System Support

- Windows XP, 2003, Vista, 2008 (32 and 64-bit versions)
- Linux (Fedora Core, Red Hat Enterprise / CentOS, SuSE, Debian, Ubuntu)
- Mac OS X 10.4.x and above FreeBSD
- Freebsd
- GPL licensed driver into Linux Kernel 2.6.25

Physical Specifications

Size: (163.0mm x 68.0mm) 6.42"L x 2.68" W

WEMI : FCC Part 15 Class B and CE

Thermal and Atmospheric Characteristics:

Work Temperature Range: +5 C ~+ 55 C

Relative Humidity Range: 5% ~ 60% non condensing

Storage Temperature: -20 ~ +80 C

MTBF: 920,585 Hours

Electrical Characteristics:

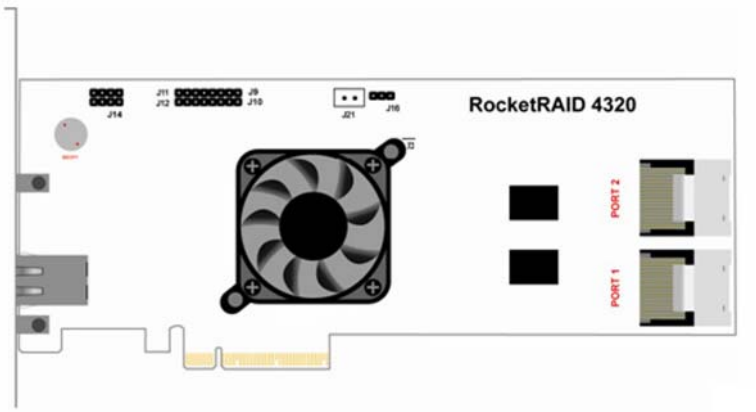
PCI-E	3.3V	12V
Power	3W max	15W max

2 - Kit Contents

- RocketRAID Host Adapter
- User's Guide
- HighPoint RAID Management and Device Driver CD
- Internal Mini-SAS to Mini-SAS cables (RR4320)

Hardware - Description and Installation

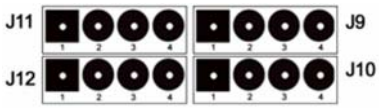
1 – RocketRAID 4320 Adapter layout



Port1- Port2 - These represent the RocketRAID 4320's 2 Internal Mini-SAS ports. Each port can support up to 4 SAS/SATA hard disks.

J9,J10,J11,J12

J9,J10 are Disk Activity LED's; J11,J12 are Disk Failure LED's.

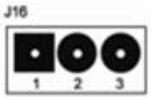


Pin - SAS/SATA channel/port stable:

PIN Number / Connections	PIN1	PIN2	PIN3	PIN4
J9	Drive1	Drive2	Drive3	Drive4
J10	Drive5	Drive6	Drive7	Drive8
J11	Drive1	Drive2	Drive3	Drive4
J12	Drive5	Drive6	Drive7	Drive8

J16

This connector supports SAF-TE interface (I2C).

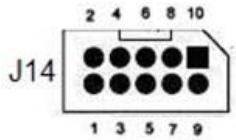


Pin definitions:

Pin 1: SCL; Pin 2: GND; Pin 3: SDA.

J14 (BBU connector)

Connector for HPTBBU-03. (optional part).



BEEP1 – Speaker

Alarm (speaker): the speaker emits an audible alarm in the case of disk/array failure.

Ethernet Port

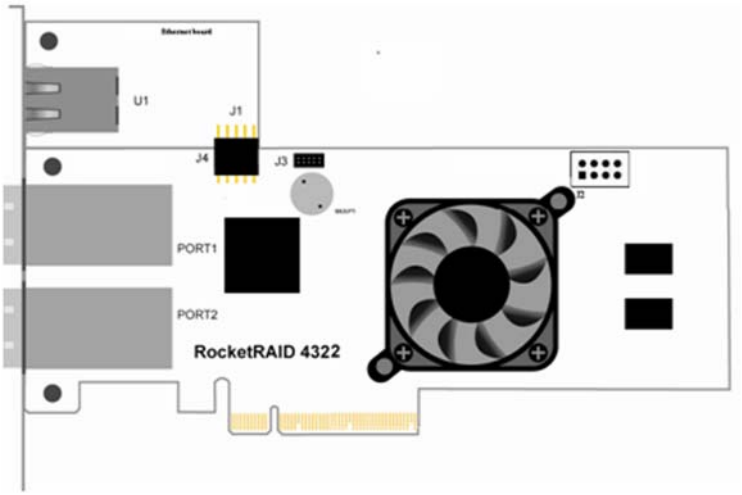
Ethernet port for Out of Bound Management, support Net Time Protocol.

Cable – Internal Mini-SAS to Mini-SAS

The RocketRAID 4320 includes 2 Internal Mini-SAS to Mini-SAS cables.

Each cable can support 4 SAS hard disks.

2 – RocketRAID 4322 Adapter layout

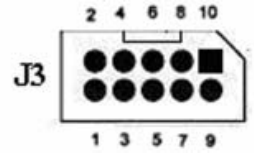


Port1, Port2

These represent the RocketRAID 's 2 External Mini-SAS ports. Each port can directly support up to 4 SAS/SATA hard drives.

J3 (Battery connector)

Connector for the HPTBBU-03 (see "Battery Backup" for details).



BEEP1 – Speaker

Alarm (speaker): the speaker emits an audible alarm in the case of disk/array failure.

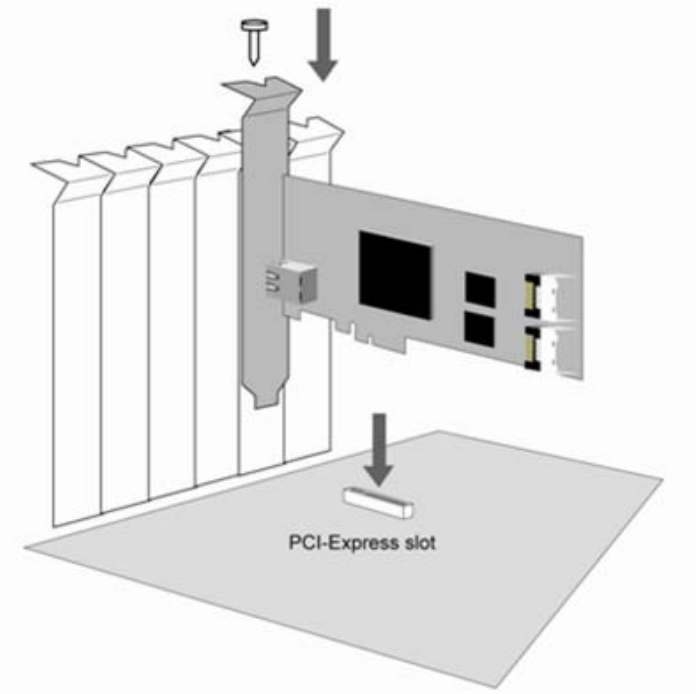
J4 (HighPoint Ethernet Board connector)

Connector for HighPoint Ethernet Board (see "Installing the HighPoint Ethernet Board" for details)

2.1 – Installing the RocketRAID 4320 Host Adapter

Note: *Make sure the system is powered-off before installing the RocketRAID 4320 host adapter.*

1. Open the system chassis and locate an unused PCI-E x8 or x16 slot.
2. Remove the PCI slot cover.
3. Gently insert the RocketRAID 4320 into the PCI-E slot, and secure the bracket to the system chassis.
4. After installing the adapter, attach the Mini-SAS cables to the RocketRAID 4320's Mini-SAS port, and the chassis backplane. Each Mini-SAS cable supports up to 4 hard disk drives. Consult the chassis's manual for proper installation procedures.
5. Close and secure the system chassis.



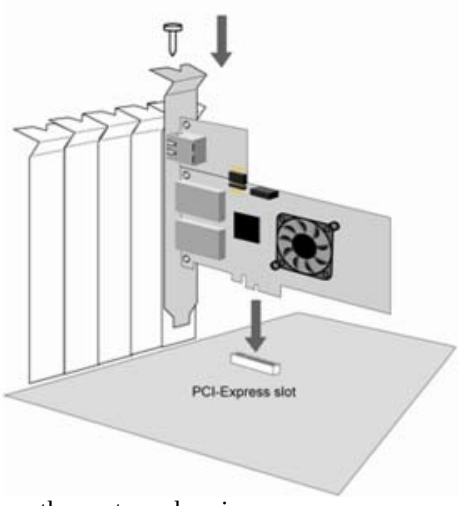
2.2 – Installing the RocketRAID 4322 Host Adapter

Note: *Make sure the system is powered-off before installing the RocketRAID 4322 host adapter.*

1. Installing the HighPoint Ethernet Board – the following *illustration shows the* HighPoint Ethernet Board.

U1 is the RJ45 connector. J1 is connector for connecting the HighPoint Ethernet Board to the RocketRAID Host Adapter. If you want to use the Ethernet functions, connect the HighPoint Ethernet Board to the RocketRAID Host Adapter via connectors J4 through J1, and secure the two boards to the bracket. If you do not want to use the Ethernet function, secure the RocketRAID Host Adapter to the bracket.

1. Open the system chassis and locate an unused PCI-Express x8.
2. Remove the PCI slot cover.
3. Gently insert the RocketRAID 4322 into the PCI-Express slot, and secure the bracket to the system chassis.



4. Close and secure the system chassis

3 - Verifying Installation

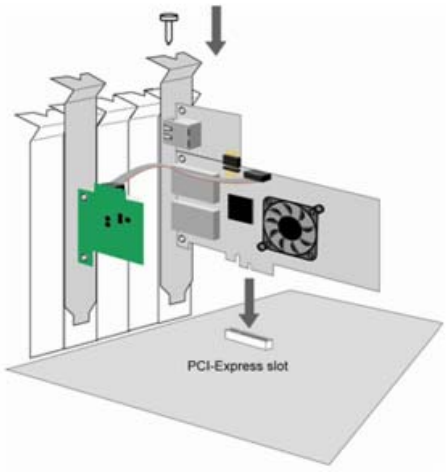
Once the RocketRAID host adapter and hard drives have been installed into the chassis, boot-up the system to verify that the hardware is properly recognized.

1. Power on the system. If the system detects the presence of the adapter, the RocketRAID BIOS Utility will be displayed during bootup.
2. Press **Ctrl+H** to access the RocketRAID adapter's BIOS Utility.

The BIOS Utility will display information about hard disks attached to the adapter. Make sure all attached disks are detected by this utility. If any of the hard disks are not detected, power down the system and check the power and cable connections.

4 - Battery Backup

A battery backup option is available as an optional add-on component. The battery provides additional data security in case of a critical system failure. Data normally lost during a major system fault, such as a power outage or CPU failure, which was in transit at the time of the failure (stored in the card's onboard cache), will remain viable for up to 72 hours. The battery unit can be attached to the card using the BBU CONN. Attach the BBU to the RocketRAID 432x, using the cable included with the BBU unit: (illustration shows the RocketRAID 4322)



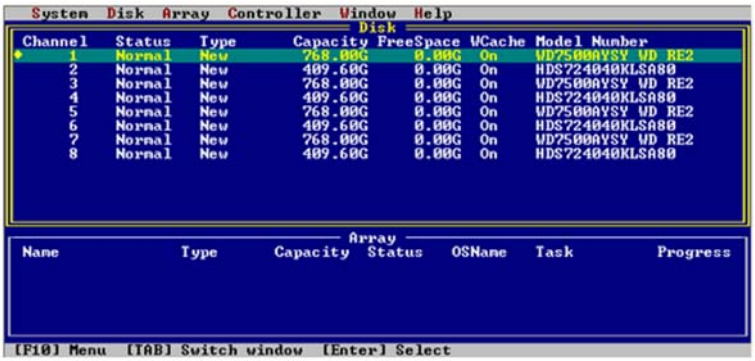
RocketRAID BIOS Utility

The RocketRAID 432x card will display it's BIOS screen during the system's boot process.

Press Control + H when prompted, to access the BIOS settings Menu.

1 - BIOS Settings Overview

The RocketRAID 432x BIOS utility is an interface that provides management commands and controller related settings.


System Disk Array Controller Window Help
Disk
Channel Status Type Capacity FreeSpace WCache Model Number
1 Normal New 768.00G 0.00G On WD7500AYSY WD RE2
2 Normal New 409.60G 0.00G On HDS724040KLSA80
3 Normal New 768.00G 0.00G On WD7500AYSY WD RE2
4 Normal New 409.60G 0.00G On HDS724040KLSA80
5 Normal New 768.00G 0.00G On WD7500AYSY WD RE2
6 Normal New 409.60G 0.00G On HDS724040KLSA80
7 Normal New 768.00G 0.00G On WD7500AYSY WD RE2
8 Normal New 409.60G 0.00G On HDS724040KLSA80
Array
Name Type Capacity Status OSName Task Progress
[F10] Menu [TAB] Switch window [Enter] Select

Using the BIOS Utility

The following keys utilized by the RocketRAID 432x BIOS utility:

F10 – press F10 to highlight the tool bar Menu.
Arrow keys – use these to move between different menu items
Enter – Open the selected toolbar command/execute the selected command.
Esc – move back to the previous menu, cancel the selected operation.
Tab – Switch between Disk and Array menus, move to next Menu item.
Space Bar – select an item (when selecting Block Size for a RAID configuration, for example).

BIOS Menu Shortcuts

The BIOS interface can also be navigated using key stroke combinations (Alt +" X"). When viewing the interface, letters highlighted in "red" represent the "X" values:

"S" – System

"D" – Disk

"A" – Array

"C" – Controller

"W" – Window

"H" – Help

"X" - Exit

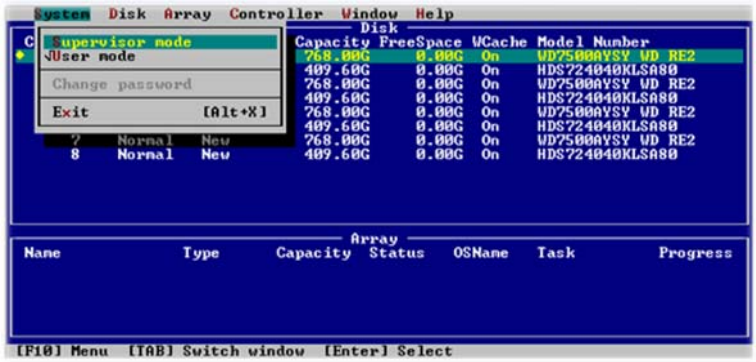
Logging In

The BIOS Utility has two interface modes: **User** and **Supervisor**

The User mode can only view information about the RocketRAID card, disks and arrays.

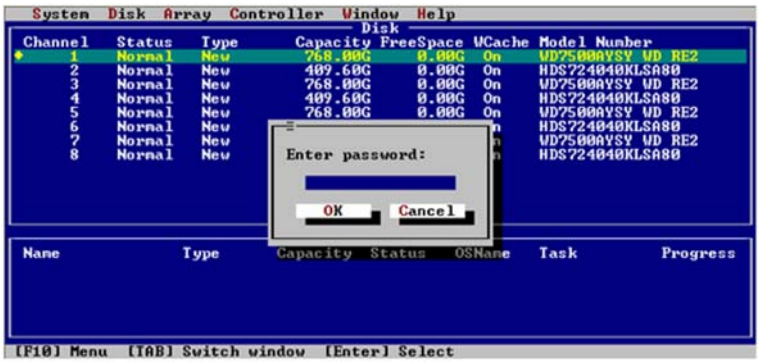
The Supervisor mode is used to create/delete arrays, and configure RocketRAID related settings. Supervisor mode requires a password – this is the same password that you will need in order to use the Web Management interface.

Press **F10** – this should bring you to the "**System**" toolbar command. Press Enter.


System Disk Array Controller Window Help
Supervisor mode
√User mode
Change password
Exit [Alt+X]
Disk
Capacity FreeSpace WCache Model Number
768.00G 0.00G On WD7500AYSY WD RE2
409.60G 0.00G On HDS724040KLSA80
768.00G 0.00G On WD7500AYSY WD RE2
409.60G 0.00G On HDS724040KLSA80
768.00G 0.00G On WD7500AYSY WD RE2
409.60G 0.00G On HDS724040KLSA80
7 Normal New 768.00G 0.00G On WD7500AYSY WD RE2
8 Normal New 409.60G 0.00G On HDS724040KLSA80
Array
Name Type Capacity Status OSName Task Progress
[F10] Menu [TAB] Switch window [Enter] Select

To log on as a User, use the arrow keys to highlight "**User mode**", and press Enter.

To log on as Supervisor, select "**Supervisor Mode"**:, and press Enter.


System Disk Array Controller Window Help
Disk
Channel Status Type Capacity FreeSpace WCache Model Number
1 Normal New 768.00G 0.00G On WD7500AYSY WD RE2
2 Normal New 409.60G 0.00G On HDS724040KLSA80
3 Normal New 768.00G 0.00G On WD7500AYSY WD RE2
4 Normal New 409.60G 0.00G On HDS724040KLSA80
5 Normal New 768.00G 0.00G On WD7500AYSY WD RE2
6 Normal New HDS724040KLSA80
7 Normal New WD7500AYSY WD RE2
8 Normal New HDS724040KLSA80
Enter password:
OK
Cancel
Name Type Capacity Status OSName Task Progress
(F10) Menu (TAB) Switch window (Enter) Select

You will be asked to enter the Supervisor password.
The default password is "**hpt**".

BIOS Commands

System

User/Supervisor modes – interface modes
Change password - for Supervisor mode
Exit the utility – quit and exit the RocketRAID BIOS utility

Disk

Information – displays information about the select hard disks
Initialize – initialize the selected disks (required in order to use new hard disks for creating RAID arrays, disk replacement, or configuring spare disks.
Toggle Spare – configure spare disks.
Unplug – remove the selected disks (hot-swap)
Turn on write cache – enable write cache for the selected disks
Turn off write cache – disable write cache for the selected disks
Rescan – prompts the RocketRAID card to scan for new hard disks.

Array

Information – displays information about the selected RAID array
Create – Create a RAID array using the selected disks
Delete – Delete the selected RAID array
Unplug – Remove the selected RAID array (safe removal of disk members of the target array - hot-swap)
Verify – Verify the selected array (checks for parity errors)
Start Task – **End Task** – Stop/Pause current task

Controller

Information – View information about the RocketRAID host adapter
Eventlog – View event log entries
Setting – View and configure host adapter settings
Network – View and configure host adapter network configuration

Window

Maximize – enlarge the selected Window
Restore – restore Windows sizes to default setting
1.Disk – toggle/select the Disk Window
2.Array – toggle/select the Array Window
Refresh – updates on screen information

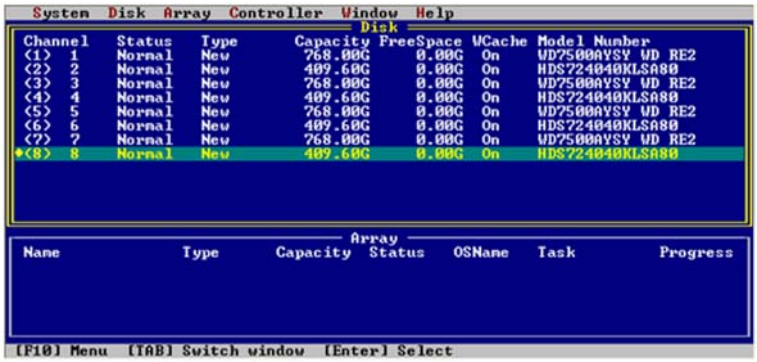
Help

About – BIOS utility/Company information

2 - Creating RAID Arrays

Initializing Disks:

Before creating a RAID array, the disks must be initialized. Disk initialization writes necessary RAID configuration information to the hard disks.


System Disk Array Controller Window Help
Disk
Channel Status Type Capacity FreeSpace WCache Model Number
(1) 1 Normal New 768.00G 0.00G On WD7500AYSY WD RE2
(2) 2 Normal New 409.60G 0.00G On HDS724040KLSA80
(3) 3 Normal New 768.00G 0.00G On WD7500AYSY WD RE2
(4) 4 Normal New 409.60G 0.00G On HDS724040KLSA80
(5) 5 Normal New 768.00G 0.00G On WD7500AYSY WD RE2
(6) 6 Normal New 409.60G 0.00G On HDS724040KLSA80
(7) 7 Normal New 768.00G 0.00G On WD7500AYSY WD RE2
*(8) 8 Normal New 409.60G 0.00G On HDS724040KLSA80
Array
Name Type Capacity Status OSName Task Progress
[F10] Menu [TAB] Switch window [Enter] Select

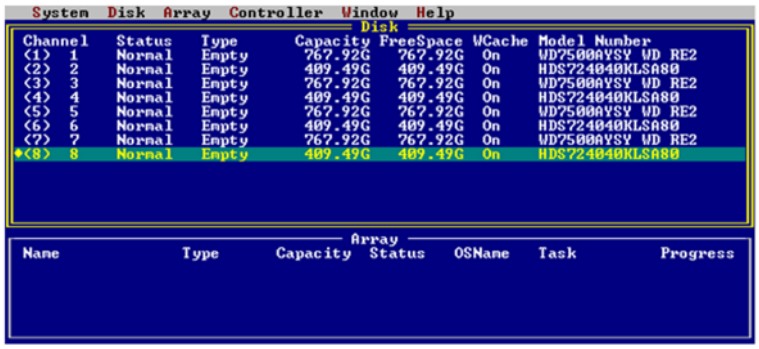
1. From the Disk window, highlight the target disks using the arrow keys, then select using Enter. A numeral will be displayed before each selected disk.
2. Once all target disks have been selected, select **Disk** from the tool bar, then highlight Initialize and press Enter.
3. The utility will display a warning, and ask you to press Y (yes) to initialize, or N (no) to cancel. Once initialized, these disks can be used to create RAID arrays. ***Warning:*** *Initialization will destroy all pre- existing data on the selected hard disks. Only initialize disks that do not contain critical data. Disks only need to be initialized once.*

Warning: *Initialization will destroy all pre- existing data on the selected hard disks. Only initialize disks that do not contain critical data. Disks only need to be initialized once.*

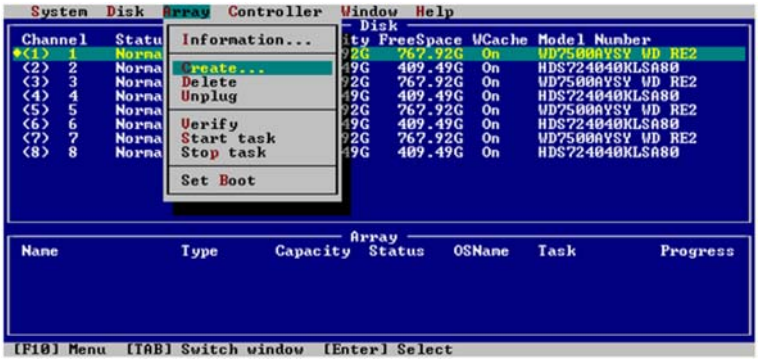
Disks do not have to be re-initialized after an array is deleted, or before creating a new array.

Creating Arrays:

From the Disk window, highlight the target disks using the arrow keys, then select using Enter. A numeral will be displayed before each selected disk. To de-select a disk, highlight the target disk, and press Enter once more.


System Disk Array Controller Window Help
Disk
Channel Status Type Capacity FreeSpace WCache Model Number
(1) 1 Normal Empty 767.92G 767.92G On WD7500AYSY WD RE2
(2) 2 Normal Empty 409.49G 409.49G On HDS724040KLSA80
(3) 3 Normal Empty 767.92G 767.92G On WD7500AYSY WD RE2
(4) 4 Normal Empty 409.49G 409.49G On HDS724040KLSA80
(5) 5 Normal Empty 767.92G 767.92G On WD7500AYSY WD RE2
(6) 6 Normal Empty 409.49G 409.49G On HDS724040KLSA80
(7) 7 Normal Empty 767.92G 767.92G On WD7500AYSY WD RE2
(8) 8 Normal Empty 409.49G 409.49G On HDS724040KLSA80
Array
Name Type Capacity Status OSName Task Progress

Once all target disks have been selected, select **Array** from the tool bar, then highlight **Create** and press Enter.



This will open the RAID creation Menu.

1. **Array Type:** First, use the Tab or arrow keys to highlight the desired RAID level, and press the Spacebar to select the Array Type. The RocketRAID 432x host adapters support RAID 0, 1, 3, 5, 6, 10, 50 and JBOD.

2. **Cache Policy:** Specify the Cache Policy of the array.

    a. **None:** No cache policy set

    b. **Write**-back – utilizes disk cache. Default setting, optimal for performance.

    c. **Write**-through – data is written directly to disk. More secure than Write-back, but will perform slower.

3. **Init Method –** For redundant arrays (RAID 1, 3, 5, 6, 10 and 50) specify the RAID Initialization method.

    a. **Quick init –** use this option if you want to quickly create an array for testing purposes. This will clear all previous data, and will not build parity. Do not use this method if data integrity is priority.

    b. **Foreground –** this will instruct the host adapter BIOS utility to start the initialization process immediately after creating the array. This option is recommended for data security.

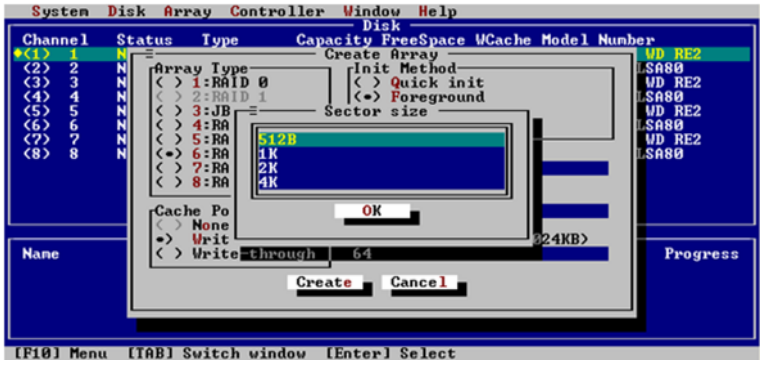
    c. **Background –** this will instruct the host adapter to initialize the array in the background, after the operating system has booted. Consider this option if you need to install an operating system to the array – this allows the array to be used immediately.

4. **Name:** Use the Tab or arrow keys and highlight **Name**. This feature allows you to name an array for reference. This is an optional setting. Press **Enter** to use the default name, or type in the desired name, and press **Enter**.

5. **Capacity (GB):** The adapter will display the full available capacity by default. If you want to specify the size of the array, type in the desired capacity (in Gigabytes), and press **Enter**. Specifying the capacity allows you to create multiple arrays using the same set of disks. Any free disk space can be used to create additional arrays, or used as a **Spare** disk (if the available capacity meets the requirement – see **5 - Maintaining Arrays – Spare Disks**, for more information).

6. **Block Size –** This option allows you to specify the block size (also known as "stripe size") for specific array types (RAID 0, 3, 5, 6, 10 and 50). You can specify block sizes ranging from 16(KB) to 1024(KB). This allows you to tailor the array for specific applications. A balanced block size of 64 (in KB) is recommended for most applications.

7. **Create / Cancel –** Use Tab or arrow keys to highlight the **Create** or **Cancel** options, and press **Enter**. Selecting **Cancel** will stop the creation process. Selecting **Create** will create an array based on your selections, and open the **Sector Size** window.



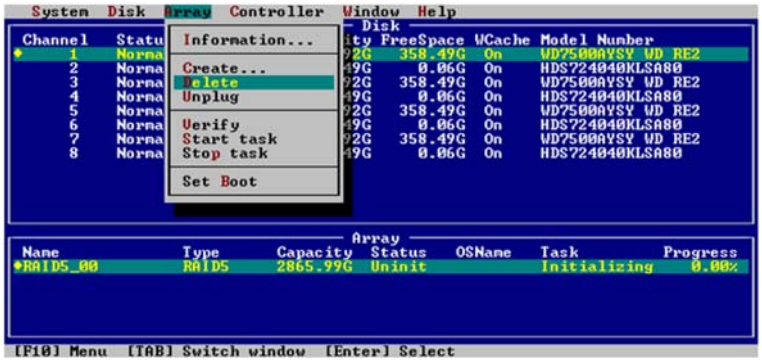
8. **Sector Size –** Also known as VSS (Variable Sector Size), this option allows you to specify the sector size of the array, for use With Windows operating systems. Older, 32-bit versions of Windows do not support volumes over 2TB in size, unless the sector size is altered. This option is not needed for Windows XP 64, Win2003 (SP1), Windows 2008, or Windows Vista. These operating systems support larger volumes, and introduce a partitioning method known as GPT (GUID Partition table). Use GPT when creating arrays over 2TB in size. For Windows 2000, or 32-bit versions of XP, refer to the following chart:

512B – Default sector size (supports up to **2TB**). Use this setting for Windows OS that support GPT.
1K – Supports arrays up to **4TB**
2K – Supports arrays up to **8TB**
4K – Supports arrays up to **16TB**

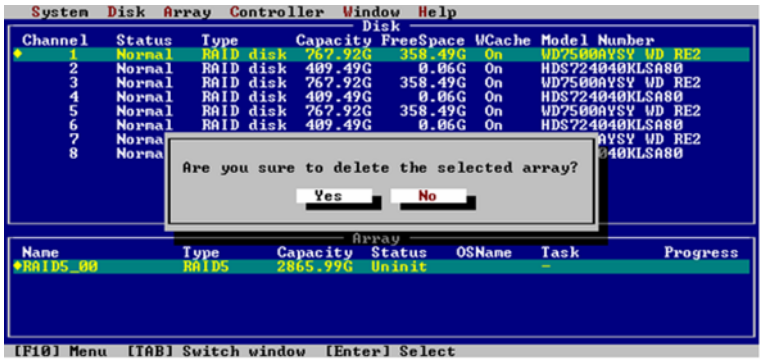
Highlight the appropriate Sector Size, and press Enter to create the array.

3 – Deleting Arrays

From the Array window, highlight the target array and press **Enter**. Highlight **Array** from the toolbar.


System Disk Array Controller Window Help
Information...
Create...
Delete
Unplug
Verify
Start task
Stop task
Set Boot
Disk
Channel Statu ity FreeSpace WCache Model Number
1 Norma 72G 358.49G On WD7500AYSY WD RE2
2 Norma 49G 0.06G On HDS724040KLSA80
3 Norma 72G 358.49G On WD7500AYSY WD RE2
4 Norma 49G 0.06G On HDS724040KLSA80
5 Norma 72G 358.49G On WD7500AYSY WD RE2
6 Norma 49G 0.06G On HDS724040KLSA80
7 Norma 72G 358.49G On WD7500AYSY WD RE2
8 Norma 49G 0.06G On HDS724040KLSA80
Array
Name Type Capacity Status OSName Task Progress
RAID5_00 RAID5 2865.99G Uninit Initializing 0.00%
[F10] Menu [TAB] Switch window [Enter] Select

Select Delete and press **Enter**. The utility will display a warning message. Press **Y** (yes) to delete the array, or select **N** (no) to cancel.


System Disk Array Controller Window Help
Disk
Channel Status Type Capacity FreeSpace WCache Model Number
1 Normal RAID disk 767.92G 358.49G On WD7500AYSY WD RE2
2 Normal RAID disk 409.49G 0.06G On HDS724040KLSA80
3 Normal RAID disk 767.92G 358.49G On WD7500AYSY WD RE2
4 Normal RAID disk 409.49G 0.06G On HDS724040KLSA80
5 Normal RAID disk 767.92G 358.49G On WD7500AYSY WD RE2
6 Normal RAID disk 409.49G 0.06G On HDS724040KLSA80
Are you sure to delete the selected array?
Yes
No
Array
Name Type Capacity Status OSName Task Progress
RAID5_00 RAID5 2865.99G Uninit -
[F10] Menu [TAB] Switch window [Enter] Select

Warning: all data stored on the array will be lost – do not delete if the array contains critical data.

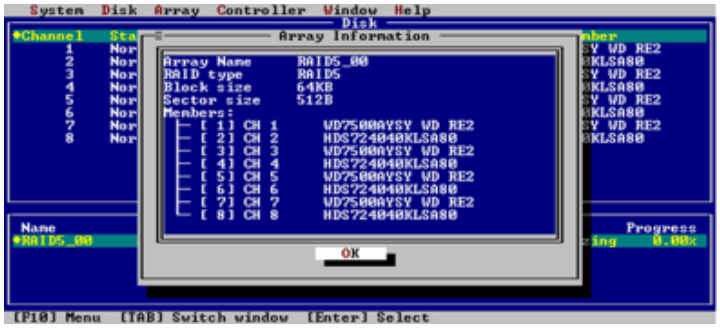
4 – Monitoring the Host Adapter, Arrays and Devices

The BIOS Settings Utility allows the Administrator to check the status of the RocketRAID host adapter, and any devices (hard disks), and arrays hosted by the adapter.

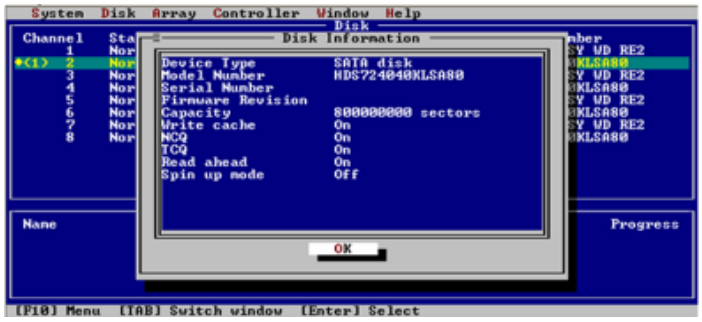
Disk/Array Status

To check the status of any disk or array, use Tab to select the Disk or Array Windows, highlight the target disk/array and press enter.

Array Information – this will display the array's Name, RAID type, Block size, Sector size, member hard disks, and status.


System Disk Array Controller Window Help
Disk
Array Information
Array Name RAID5_00
RAID type RAID5
Block size 64KB
Sector size 512B
Members:
[1] CH 1 WD7500AYSY WD RE2
[2] CH 2 HDS724040KLSA80
[3] CH 3 WD7500AYSY WD RE2
[4] CH 4 HDS724040KLSA80
[5] CH 5 WD7500AYSY WD RE2
[6] CH 6 HDS724040KLSA80
[7] CH 7 WD7500AYSY WD RE2
[8] CH 8 HDS724040KLSA80
OK
Name
Progress
[F10] Menu [TAB] Switch window [Enter] Select

Disk Information – this will display the disk Model Number, serial number, firmware revision, capacity, and various disk related settings (NCQ, TCQ, Read Ahead, Write Cache, and Staggered Drive spinup mode).



Alternately, highlight the target disk/array, then highlight either Disk or Array from the tool bar, select Information, and press Enter.

Controller Information

Highlight **Controller** from the toolbar, select **Information**, and press **Enter**.

Array Information – this will display the array's Name, RAID type, Block size, Sector size, member hard disks, and status.

This option will display information about the host adapter's model (Product ID), PCI-E bus location, IO Processor model, memory, firmware revision, serial number, and the status of the BBU (battery backup unit).

Event Log

The RocketRAID host adapter automatically generates Event Log entries during the case of routine administration (creating arrays), or in the case of a critical error (disk or array failure).

Highlight **Controller** from the toolbar, select **Event Log**, and press **Enter**.

System Disk Array Controller Window Help
Disk
Channel Status Type Capacity FreeSpace WCache Model Number
Eventlog
Filter: [X] Information [X] Warning [X] Error
Time Type Description
2007-09-27 11:00:45 Info Test eventlog 1.
2007-09-27 11:01:45 Warning Test eventlog 2.
2007-09-27 11:02:45 Error Test eventlog 3.
2007-09-27 11:03:45 Info Test eventlog 4.
2007-09-27 11:04:45 Warning Test eventlog 5.
2007-09-27 11:05:45 Error Test eventlog 6.
2007-09-27 11:06:45 Info Test eventlog 7.
2007-09-27 11:07:45 Warning Test eventlog 8.
2007-09-27 11:08:45 Error Test eventlog 9.
2007-09-27 11:09:45 Info Test eventlog 10.
Clear
Prev
Next
Cancel
[F10] Menu [TAB] Switch window [Enter] Select

Use this option to view Event Log information, including **Errors** (disk or array failure), **Warnings** (problems such as disk sector or Smart issues) and **Information** (such as the creation or deletion of arrays).

You can filter displayed events by using Tab to highlight the **Information**, **Warning**, and **Error** options towards the top of the window. Enable or disable these filter options using the **Spacebar**.

Use the Clear option to delete all Event Log entries. Use the **Prev** and **Next** option to scroll through log entries. Select **Cancel** (or press Esc) to exit the window.

5 – Maintaining Arrays

The BIOS Settings Utility provides several RAID and device related maintenance functions, including device and controller settings, Network Configuration settings (for managing the host adapter, remotely), and rebuilding broken/degraded RAID arrays.

Network Settings

This option allows the Administrator to configure Network Settings for use with the RocketRAID host adapter's Out-of-Band (OOB), and In-Band (IB) Management functions.

Highlight Controller from the toolbar, select **Network**, and press **Enter**.

This option will display information about the host adapter's network settings. By default, these settings are configured automatically, based on information provided by the local network. To manually configure these settings, use the Tab or arrow keys and highlight **Use automatic config**, and press the **Spacebar**. Type in the appropriate network settings, highlight **OK**, and press **Enter**.

Controller Settings

Highlight Controller from the toolbar, select Settings and press Enter.

System Disk Array Controller Window Help
Controller Setting
[X] Enable audible alarm
[ ] Enable staggered spin up
Number of drives per spin up
Delay between spin up (seconds)
[ ] Spin down idle disk (minutes)
[ ] Enable automatic rebuild
Rebuild priority
( ) lowest
( ) low
( ) mediun
( ) high
( ) highest
[X] Provide INT13 support
[X] Use single BCV entry
[X] Stop on error
[X] NCQ
[ ] SGPIO for LED control
OK
Cancel
[F10] Menu [TAB] Switch window [Enter] Select

Use the tab and arrow keys to select each item, and the Spacebar to enable/disable the target option.

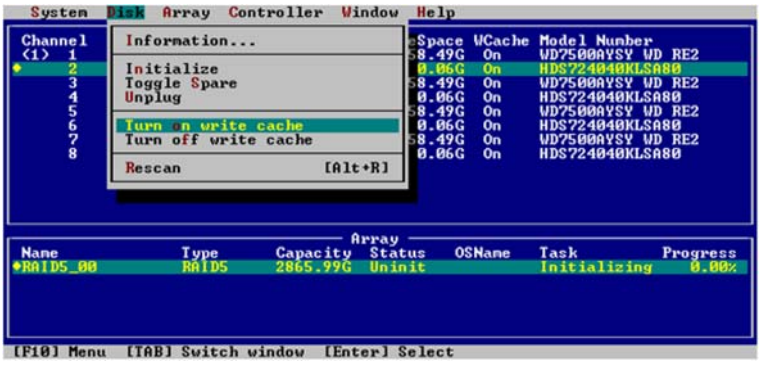
- **Enable Audible Alarm** – enables/disables card's alarm (beeper)
- **Enable Staggered drive spinup** – enable/disable staggered drive spin-up. Disabled by default. If enabled, the host adapter will spin disks in sequence (one disk, every "x#" of seconds – enter the desired value). Some hard disks do not support this setting – consult the hard disk's documentation for more information.
- **Spin down idle disk** – If enabled, the host adapter will power down idle (inactive) disks/arrays based on the allotted time. Specify the value (in minutes)
- **Rebuild Priority** – This option is provided for redundant arrays. This setting determines the priority of rebuilding arrays in regards to other system tasks.
- **Provide INT13 support** – enable or disable INT13 (the host adapter's boot function). Disabling this setting may resolve motherboard BIOS related issues in cases where the card cannot be loaded into memory properly (option ROM/out of memory errors).

- **Use Single BCV Entry** – also related to motherboard BIOS settings (troubleshooting)
- **Stop on Error** – Enabled by default. If disabled, the host adapter BIOS menu will bypass array or device errors when booting the system.
- **NCQ** – enable/disable NCQ (native command queuing)

Device Settings

These options allow the administrator to enable or disable hard disk cache related settings.

From the Disk Window, highlight the target disk and press Enter. Highlight Disk from the toolbar:



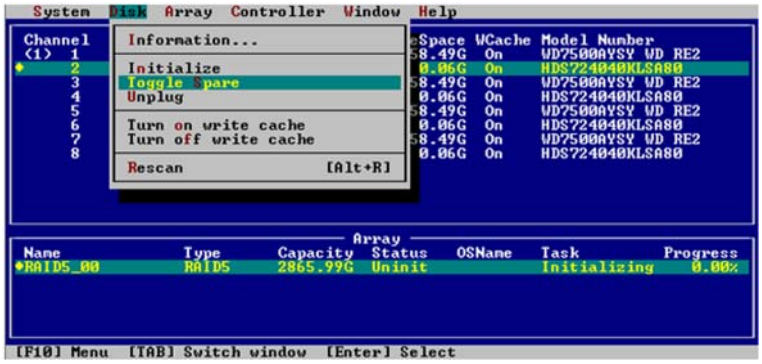
Turn on Write cache – enables the use of the hard disk cache. This is the recommended setting

Turn off write cache – disable the use of the hard disk cache. Use this setting for troubleshooting hard disks, or for testing purposes. Disabling disk cache will lower performance

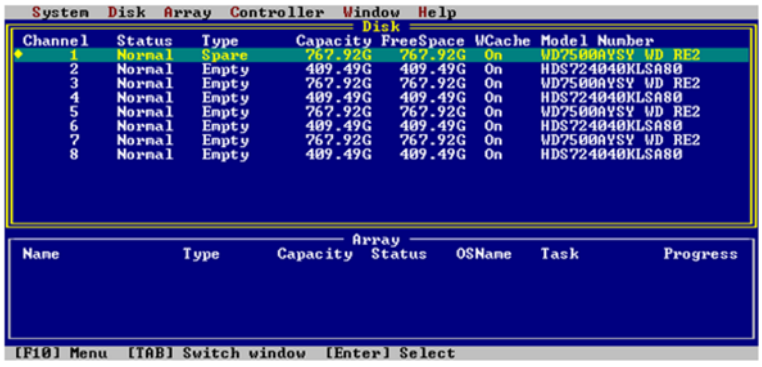
Spare Disks

Spare Disks are used to automatically rebuild Redundant RAID arrays in the case of disk failure. As with creating RAID arrays, disks must be initialized before they can be used as spares. To set a hard disk to act as a Spare Disk, switch to the Disk window, use the arrow keys to select the target disk from the list of initialized disks, and press **Enter**.

Highlight **Disk** from the toolbar, then select **Toggle Spare**, and press **Enter**.



To remove a spare, follow the same procedure. From the Disk window, select the target Spare disk and press Enter. Highlight **Disk** from the toolbar, select **Toggle Spare** and press **Enter**.


System Disk Array Controller Window Help
Disk
Channel Status Type Capacity FreeSpace WCache Model Number
1 Normal Spare 767.92G 767.92G On WD7500AYSY WD RE2
2 Normal Empty 409.49G 409.49G On HDS724040KLSA80
3 Normal Empty 767.92G 767.92G On WD7500AYSY WD RE2
4 Normal Empty 409.49G 409.49G On HDS724040KLSA80
5 Normal Empty 767.92G 767.92G On WD7500AYSY WD RE2
6 Normal Empty 409.49G 409.49G On HDS724040KLSA80
7 Normal Empty 767.92G 767.92G On WD7500AYSY WD RE2
8 Normal Empty 409.49G 409.49G On HDS724040KLSA80
Array
Name Type Capacity Status OSName Task Progress
[F10] Menu [TAB] Switch window [Enter] Select

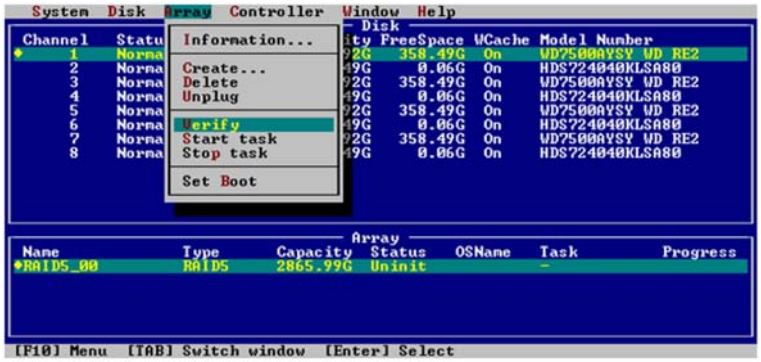
Generally, single disks are designated to act as spares (disks that are not configured into RAID arrays).

However, in some instances, disks that are members of RAID arrays may also be assigned to act as a spare disk. If the disks in question are part of a RAID array that did not utilize the full available capacity at the time of creation, these disks may be used as spares. For example: a RAID 0 array was created between two 200GB hard disks, but only 200GB of space (out of a grand total of 400GB), was assigned to that array. In this example, 200GB of disk space remains unallocated. This unallocated space allows these disks to be set as spares for a separate redundant array that meets the capacity requirement (200GB or less).

Verifying Arrays

Routine RAID verification is essential for maintaining the integrity of data stored on redundant RAID arrays. The RocketRAID BIOS utility allows you to manually verify RAID arrays.

From the Array window, highlight the target array and press **Enter**. Highlight **Array** from the toolbar, select **Verify**, and press **Enter**.



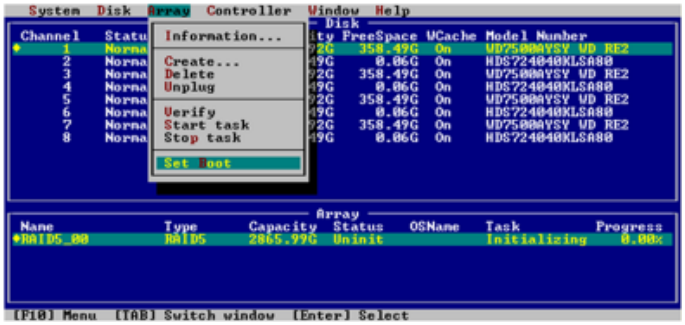
Progress will be displayed towards the lower right-hand corner of the screen (percent complete).

To stop or pause the verification process, select **Stop Task** from the same menu. To continue the verification process, select **Start Task**.

6 – Additional Functions and Settings

Set Boot

Highlight the target array from the Array window and press Enter. Highlight Array from the toolbar:



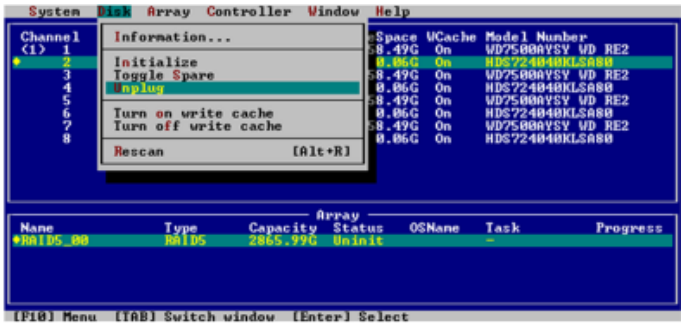
Note: Use this option to set an array to act as the boot device. The selected array will act as the boot "disk", if the motherboard's BIOS instructs the card to act as the system's boot device.

Hot-Swap

The BIOS utility provides several options that allow the administrator to add or remove disks and arrays, without powering down the system.

Adding/removing Disks

To prepare a disk for removal, first highlight the target disk using the Disk window and press **Enter**. Highlight Disk from the toolbar, select **Unplug,** and press **Enter**.

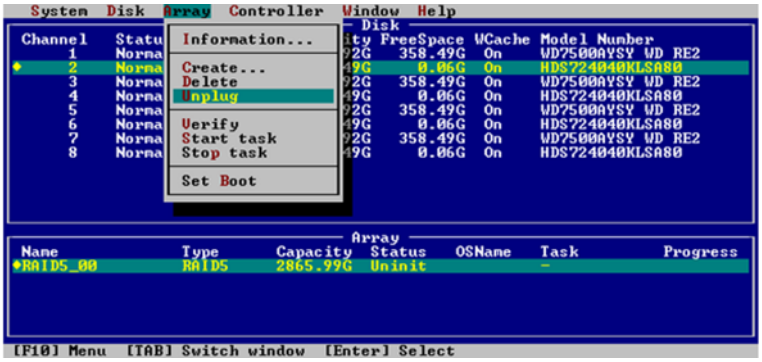


To add a disk, install the hard disk, then highlight **Disk** from the toolbar, select **Rescan**, and press **Enter**.

Note: After installing the disk into the hot-swap capable drive bay, wait several seconds to allow the disk to fully power on, before using the Rescan command.

Adding/removing Arrays

To prepare a RAID array for removal, highlight the target array using the Array window and press **Enter**. Highlight **Array** from the toolbar, select **Unplug**, and press **Enter**.



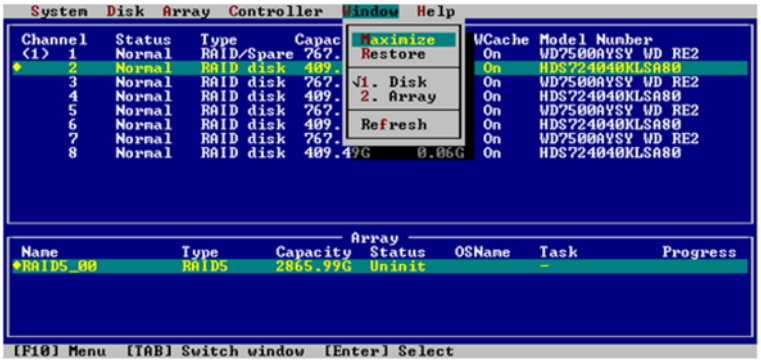
The interface will notify you when the disk can be removed.

To add an array, install all of the RAID hard disks, then highlight **Window** from the toolbar. Select **Refresh**, and press **Enter**.

Note: After installing the hard disks into the hot-swap capable drive bays, wait several seconds to allow the disks to fully power on, before using the Rescan command.

Window Menu

The Window menu provides several view options.


System Disk Array Controller Window Help
Channel Status Type Capac WCache Model Number
(1) 1 Normal RAID/Spare 767. On WD7500AYSY WD RE2
2 Normal RAID disk 409. On HDS724040KLSA80
3 Normal RAID disk 767. On WD7500AYSY WD RE2
4 Normal RAID disk 409. On HDS724040KLSA80
5 Normal RAID disk 767. On WD7500AYSY WD RE2
6 Normal RAID disk 409. On HDS724040KLSA80
7 Normal RAID disk 767. On WD7500AYSY WD RE2
8 Normal RAID disk 409.4 On HDS724040KLSA80
Maximize
Restore
√1. Disk
2. Array
Refresh
9G 0.06G
Array
Name Type Capacity Status OSName Task Progress
RAID5_00 RAID5 2865.99G Uninit -
[F10] Menu [TAB] Switch window [Enter] Select

- **Maximize** – enlarge viewing area of the selected window (Disk or Array)
- **Minimize** – reduce the viewing area of the selected window)
- **Disk** – selects the Disk window
- **Array** – selects the Array window
- **Refresh** – scans for any hardware changes (used when adding arrays or disks to the card)

HighPoint RAID Management and Device Driver CD

Each retail box includes a copy of the HighPoint Products Software CD.

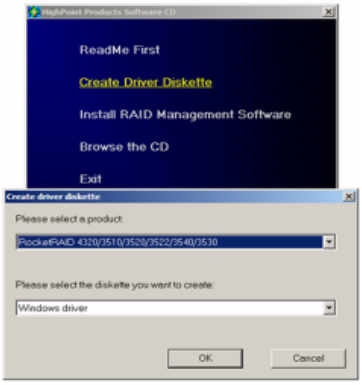
This CD can be used to generate driver diskettes, and install the HighPoint RAID Management Utility Suite for a variety of operating systems.

1 - Creating a driver diskette

Windows 2000, 2003 and several distributions of Linux and FreeBSD require driver diskettes when installing the operating system directly to a disk or array hosted by the Rocket RAID host adapter.

To create a driver floppy diskette:

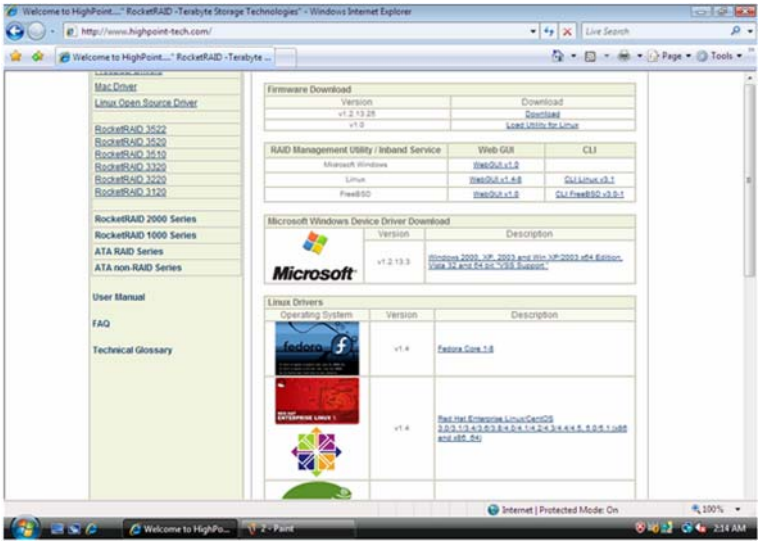
1. Insert the CD into the system's CD/DVD drive. The program should start automatically.
2. Insert a blank floppy diskette into the system's floppy drive.
3. Click on "Create Driver Diskette".
4. Click on the "Please Select a Product" drop-down button, and select the appropriate host adapter model from the list.
5. Click on the "Please Select the Diskette you want to create" drop-down button, and select the desired operating system from the list.
6. Click on the "OK" button to create the driver diskette.



2 - Device Driver Installation

We recommend visiting the RocketRAID download page for the latest Windows Device Driver updates:

RocketRAID 4320
http://highpoint-tech.com/USA/bios_rr4320.htm
RocketRAID 4322
http://highpoint-tech.com/USA/bios_rr4322.htm



Drivers are posted in .zip archive format. Most Windows operating systems will recognize this archive format, natively. Double click the driver download to view and extract their contents. Drivers can be extracted and/or copied to various media.

Windows Driver Installation (Win2000, XP, Win 2003)

Before installing the RocketRAID 432x host adapter's device driver, make sure the host adapter and all required hard disks have been installed into the system's chassis/ disk enclosure. If you are working with a supplied driver, or driver download, you will want to extract the contents directly to a directory of your choice (or device). You will need to browse to this location, in order to load the driver (see step 2, below).

Installing the RocketRAID 432x driver for an existing Windows system.

After the operating system has booted, Windows will automatically detect the RocketRAID 432x host adapter, and request that a device driver be installed. To install the device driver, follow the steps outlined below:

1. When the "Found **New Hardware Wizard**" window appears, select "**Install from a list or specific location (Advanced)**", and click Next to continue.
2. Click on the "**Include this location in the search**" option, and select the system's floppy drive (generally Disk A). Next, insert the Driver Installation diskette into the system's floppy drive, or select Browse, and browse to the location of the driver. ***If you are using the RocketRAID 432x software CD, the drivers are located in RR3xxx_4xxx – Windows –Driver– Windows (then select the appropriate folder).***
3. Windows may display a warning message that states the driver has "**not been signed**". Select "**Continue Anyway**", then click Finish when prompted. When windows asks to reboot the system, choose No.
4. emove the Driver Installation diskette from the floppy drive, then Shut down and restart the computer.

Installation Verification

After the driver has been installed, and the system has been restarted:

1. Click the Start button, then right-click the "My Computer" icon. Select the Properties item from the pop up menu.
2. In the popup window, click the "Hardware" tab then click Device Manager button.
3. Double click the "**SCSI and RAID controllers**" entry. If the RocketRAID 432x device entry is not displayed, or there are "?" or "!" marks displayed near the RocketRAID 432x entry, the driver has not been installed properly. Delete the entries and reinstall the driver.

Installing the RocketRAID driver during a fresh Windows installation

1. After booting from the Windows CD or DVD-ROM, when the Windows Setup blue screen appears, look towards the bottom of the screen. Windows will prompt you to press the **F6** key if you want to install a third party SCSI or RAID driver. Press the **F6** key at this time.
2. The setup procedure will continue, and will later instruct you to press the "**S**" key to specify additional adapters. Press the "**S**" key as instructed.
3. Next, the setup program will prompt for the insertion of the driver diskette. Please insert the driver diskette, and then press ENTER to continue.
4. The next window will display several driver options. Please select the driver for the corresponding operating system, and press ENTER to continue.

Windows Vista/2008 Driver Installation

Installing the driver during a fresh Windows Vista/2008 installation

1. Boot from Windows Vista DVD.
2. When the screen "**where do you want to install Windows**" appears, click "**Load driver**" and browse for the driver location. Windows Vista will accept install drivers from various sources: floppy diskette, USB flash disk or CD. ***If you are using the RocketRAID 432x software CD, the drivers are located in RR3xxx_4xxx – Windows-Driver – VistaWin2008 – 32 (or 64, if you are running a 64-bit version of the operating system).***
3. Select the RocketRAID 432x controller driver, and click "**Next**".
4. The driver is now installed – you can now commence with the standard OS installation procedures.

Installing the driver for an existing Windows Vista/2008 system

1. Intall the RocketRAID 432x host adapter into the PC, then boot up Windows.
2. Windows should automatically detect the card, and display the "Found **New Hardware**" wizard pop-up window. Select "**Locate and install driver software**". When Windows asks: "**Windows needs your permission to continue**", select "continue".
3. Select "I don't have disc, show me other options" and then select "Browse my computer for driver software".
4. Specify the location of the driver and click "Next. ***If you are using the RocketRAID 432x software CD, the drivers are located in RR3xxx_4xxx – Windows-Driver – VistaWin2008 – 32 (or 64, if you are running a 64-bit version of the operating system).***
5. When asked: "Would you like to install this driver software?" select "Install".
6. Reboot the system when prompted. The RocketRAID 432x will be available for use after Windows reboots.

Installation Verification

After the driver has been installed, and the system has been restarted:

1. Click the Start button, then right-click My Computer icon. Select the Properties item from the popup menu.
2. In the popup window, select Hardware tab and then click Device Manager button.
3. Double click the "**Storage Controllers**" entry. If the RocketRAID 432x device entry is not displayed, or there are "?" or "!" marks displayed near the RocketRAID 432x entry, the driver has not been installed properly. Delete the entries and reinstall the driver.

Linux and FreeBSD Device Driver installation

The RocketRAID 4320 and 4322 host adapters are fully GPL compliant, and are natively support by Linux kernel 2.6.25x. Linux distributions that utilize this kernel (and all later releases) will automatically recognize the host adapter, and do not require driver installation.

In addition, binary and source driver updates are routinely posted for a variety of older Linux operating systems including past versions of Red Hat Enterprise, CentOS, OpenSuSE, and Fedora Core.

Drivers are also available for several FreeBSD revisions, and are available from the same support page:

RocketRAID 4320
http://highpoint-tech.com/USA/bios_rr4320.htm
RocketRAID 4322
http://highpoint-tech.com/USA/bios_rr4322.htm

Several driver sets are included with the RocketRAID 432x Software CD.
Each binary driver and source package includes an installation guide (.pdf format).

Linux Driver sets:

RR3xxx_4xxx/Linux directory.

FreeBSD Driver sets:

RR3xxx_4xxx/FreeBSD directory.

3 - HighPoint RAID Management Utilities (HRM)

The HighPoint RAID Management Utility Suite, also known as "HRM", includes several user interface options. The latest version of the Web Management utility user manual, is available from our website.

Windows Operating Systems – Installing the Web-based Management Utility

Click on "**Install RAID Management Software**".

Select the desired software from the drop down menu, and click on the "OK" button.

HighPoint Products Software CD
ReadMe First
Create Driver Diskette
Install RAID Management Software
Install Management Software
Please select the software to install:
HighPoint Web RAID Management Software (for RocketRAID 2xxx)
HighPoint Web RAID Management Software (for RocketRAID 3120/3510/3520)
HighPoint In-Band Management Service (for RocketRAID 3xxx/4xxx with OBM)
OK
Cancel

Red Hat Enterprise/CentOS, Fedora Core, Open SuSE – Installing the Web-based Management utility

Linux operating systems that support .rpm packages, allow you to double-click the HighPoint Web RAID Management .rpm file to start the installation process.

1. Copy the Web RAID Management package from the RR432x Software CD, to the desktop of the Linux operating system. The .rpm file is located in HighPoint RAID Management Software – RR3xxx_4xxx - Linux – WebGui-Linux.tbz.
2. Extract the .tbz file to the desktop, and browse to the appropriate .rpm file (there are 32 and 64-bit options).
3. Double click the .rpm file – this should open the operating systems' software installer. Enter the Administrative password when prompted and proceed with installation.
4. The package can also be installed manually, using a terminal. Lon in as "root", open a terminal, and browse to the location of the .rpm file. Run the following command:
5. # rpm -i hptsvr-https-1.4-8.i386.rpm (or hptsvr-https-1.4-8.x86_64.rpm)

Note: *The i386 rpm package can also work on 64-bit systems if you have 32-bit runtime libraries installed. If you use the x86_64 rpm package, please make sure the controller driver has 64-bit ioctl support.*

Debian/Ubuntu Linux Distributions – Installing the Web-based Management Utility

For Debian/Ubuntu Linux distributions, you can use **alien** to convert the rpm packages to a .deb package, then use "**dpkg -i**" command to install each package. Some script files may be lost during the conversion process from rpm to .deb, so you may need to make manual corrections.

The following files will be installed/configured:

/usr/bin/hptsvr - service program
/etc/hptcfg - service config file
/etc/rc.d/init.d/hptdaemon - service control script
/usr/share/hpt/webguiroot - data files

If there is no /etc/hptcfg present, you can add it manually using by using the "echo" command on the driver file name to /etc/hptcfg.

For example:
echo hptiop.ko >/etc/hptcfg

Uninstalling the Utility

Open a terminal, and use the following command:
rpm -e hptsvr-https

Linux Distributions – Command Line Interface (CLI)

Command Line interface versions of the RocketRAID management utilities are available for Linux and FreeBSD operating systems.

These packages are posted on the HighPoint Technologies, Inc. website, under the BIOS & Driver downloads page for the RocketRAID 4320 and 4322.

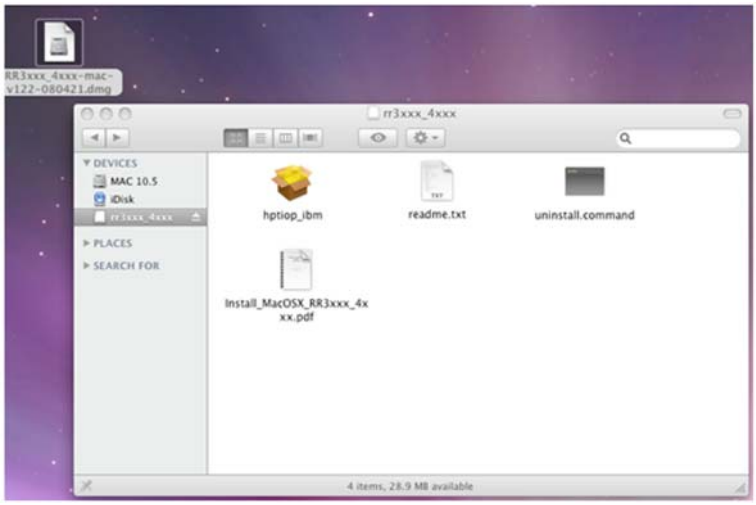
Mac OS X Driver and Web-based RAID Management Utility

The driver and software packages for the RocketRAID 4320 and 4322 includes both the device driver for OS X, and a copy of the Web RAID Management utility.

Please check http://www.hptmac.com for the latest software/driver packages.
Driver updates are posted on the card's product page, under the "Download Center" section.
The latest package is posted towards the right-hand side of the page, under "Mac Driver". On the left-hand side of the page, there is a section devoted to user documentation. The latest versions of the Product, and Web-based RAID Management Manuals are posted here.

Mac OS X Driver and RAID Management Installation

The driver and software packages for the RocketRAID 4320 and 4322 includes both the device driver for OS X, and a copy of the Web RAID Management utility. Copy the Mac driver and software package from the Software CD, to the Mac Desktop. Open the .dmg file, and double click "rr3xxx_4xxx" to begin installation.

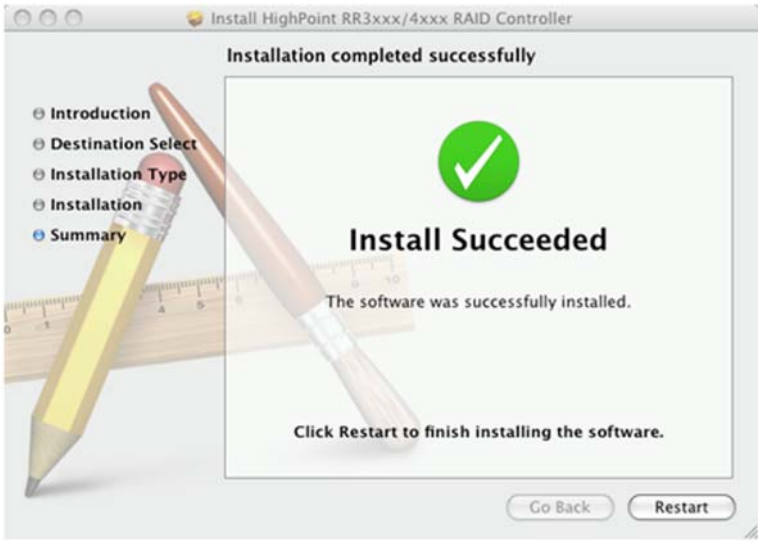


Click "**Continue**" to proceed with installation

Select the installation destination:

Install HighPoint RR3xxx/4xxx RAID Controller
Select a Destination
Introduction
Destination Select
Installation Type
Installation
Summary
Select the volume where you want to install the HighPoint RR3xxx/4xxx RAID Controller software.
MAC 10.5
216 GB available
232 GB total
Installing this software requires 1.2 MB of space.
You have chosen to install this software on the volume "MAC 10.5".
Go Back
Continue

Click "**Continue**"



Click "**Restart**" – after OS X reboots, the card will be recognized by the system. Configure arrays using the Web RAID Management interface. User guides for the Web interface are available from http://www.hptmac.com. Check the product page for the RocketRAID 4322 or 4320, and click on the "Download Center" link.

Customer Support

If you encounter any problems while utilizing the RocketRAID host adapter, or have any questions about this or any other HighPoint product, feel free to contact our Customer Support Department.

Troubleshooting Checklist

Before contacting our Customer Support department:

- Make sure the latest BIOS, driver and HighPoint RAID Management software has beein installed for the host adapter. The latest updates are available from our website.
- Prepare a list of the computer system's hardware and software (motherboard, CPU, memory, other PCI-E devices/host adapters, operating system, applications)

Contact Information

E-mail address: support@highpoint-tech.com

Phone: 408-240-6119

9:00AM-5:00PM, Pacific Standard Time

Contact Us

HighPoint Corporate Headquarter USA

Address 1161 Cadillac Ct.
Milpitas, CA, 95035
Website: http://www.highpoint-tech.com
Phone: 1-408-942-5800 (9 am ~ 6 pm PST, M-F) **Fax:** 1-408-942-5801
E-mail: sales@highpoint-tech.com
Support: support@highpoint-tech.com
Support Phone: 1-408-240-6108 (9 am ~ 5 pm PST, M-F)

HighPoint Taiwan

5F., No.3, Swei Lane , Jhongjheng Rd.
Sindian City, Taipei County 231, Taiwan (R.O.C.)
Website: http://www.highpoint-tech.com/Taiwan/indextw.htm
Phone: + 886-2-2218-3435 (9 am ~ 6 pm)
Fax: +886-2-2218-3436
E-mail:sales@highpoint-tech.com
Support: support@highpoint-tech.com

HighPoint China

4th Floor Kehaifulin Building, N0. 12
Zhong Guan Cun South Rd.
Haidian District Beijing, China 100081
Website: http://www.highpoint-tech.cn/
Phone: + 86-10-6213-0920 (9 am ~ 6 pm)
Fax: +86-10-6897-5074
E-mail: sales@microaurora.com.cn
Support: support@microaurora.com.cn

FCC Part 15 Class B Radio Frequency Interference statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Modifications not expressly approved by the manufacturer could void the user's authority to operate the equipment under FCC rules.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

European Union Compliance Statement

This Information Technologies Equipment has been tested and found to comply with the following European directives:

- European Standard EN55022 (1998) Class B
- European Standard EN55024 (1998)

Thank You

Thank you for purchasing the RocketRAID 432x SATAII RAID Host adapter. We appreciate your support, and welcome any questions, comments or product suggestions you may have.